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The Vertical Gracilis Myocutaneous Flap for Breast Reconstruction in a Massive Weight Loss Patient

SUMMARY

Background: The number of patients undergoing bariatric surgery is increasing worldwide. Different types of free flaps are often used for breast reconstruction following mastectomy. We present a not previously described case utilizing a vertical myocutaneous gracilis flap for breast reconstruction in a massive weight loss patient.

Case: The patient was a 61-year post woman who previously had a lumpectomy for an in situ ductile carcinoma of her left breast. Subsequently the patient underwent a full mastectomy in 2020 due to a recurrence.

Discussion: The massive weight loss population poses a challenge in reconstructive surgery, due to their higher risk of complications. However, we still believe free flaps should be considered as a valid option for breast reconstruction for these patients. Due to the often increased size of perforator vessels in these patients, other flaps than the usually preferred ones may prove more suitable.

BACKGROUND

The number of patients undergoing bariatric surgery is increasing worldwide.[1] These patients are more prone to complications following surgery than the background population.[2] Several different types of free flaps are well described for breast reconstruction following mastectomy, such as the deep inferior epigastric perforator flap ( DIEP), the superficial inferior epigastric artery flap, the profunda artery perforator ( PAP) flap, the transverse myocutaneous gracilis ( TMG) flap and the inferior/superior gluteal artery perforator flaps ( IGAP/SGAP).[3] We present the, to our knowledge, first case of a massive weight loss ( MWL) patient having breast reconstruction utilizing a vertical myocutaneous gracilis ( VMG) flap.

CASE PRESENTATION

The patient, a 61-year woman, previously had a lumpectomy for an in situ ductile carcinoma of her left breast. Subsequently the patient underwent a full mastectomy in 2020 due to a recurrence, see figure 1. In 2016 the patient underwent a gastric sleeve operation, leading to a weight loss from a maximum weight of 130 kg to 87 kg, equivalent to a BMI reduction from 47 to 31.
In April 2021 the patient was examined in the outpatient clinic. The patients wished an autologous breast reconstruction. The patient had already had a lower body lift including a fleur de lis abdominoplasty, which meant that we would not be able to use the deep inferior epigastric artery perforator flap, due to a lack of donor tissue and perforators in the abdomen. The patient had a sufficient amount of excess tissue on her thighs, which were found suitable as donor sites for the autologous breast reconstruction. The patient suffered from lymphedema in her left thigh following previous knee replacement surgery, so we opted for the right thigh as donorsite. Three perforators were identified in close proximity to the gracilis muscle by color Doppler ultrasonography and were found suitable as donor vessels.

The skin island was designed vertically as a standard thigh lift above the location of the gracilis muscle. The skin was incised along the lateral border of the peroperative markings. The underlying soft tissue was dissected to the gracilis fascial sheath, while doing so the great saphenous vein was identified and spared. The vascular pedicle was identified between the adductor longus and magnus muscles, see figure 2. The vascular pedicle was carefully dissected towards its origin from the medial branch of the circumflex femoral artery. The muscular branch to the gracilis, from the anterior branch of obturator nerve, was also identified. The gracilis muscle was isolated through further dissection. Hereafter, a skin incision was made along the medial marking of the skin and subcutaneous dissection was carried out. The inferior part of the gracilis muscle was transected and the flap was raised in a distal to proximal direction. The gracilis muscle was then transected at its origin, leaving the flap attached only to the vascular pedicle and nerve.

Flap perfusion was evaluated using the HyperEye Medical System after intravenous administration of indocyanine green.

Simultaneously the mastectomy scar was removed and the skin flaps were raised to create a pocket for the reconstruction and flaps insertion. The recipient internal mammary vessels were accessed through the pectoralis major muscle and by removing the costal cartilage at the level of the third costa. One artery and vein were identified as suitable recipient vessels.

The donor vessels and the nerve attached to the VMG flap were then transected. The VMG was moved to the recipient site and the vessels were anastomosed under the microscope using a nylon 9.0 suture for the artery and a 1.5 mm vein coupler for the vein. The flap was then placed under the superior skin flap and shaped and deepithelialized accordingly. The flap was shaped using 3.0 braided absorbable sutures and 3.0 absorbable monofilament sutures were used for skin closure. Two drains were placed laterally and a micro dialysis catheter was installed in the flap. The donor site was closed as it would in a standard thighplasty, without drains. The patient was given compression garments to reduce the risk of donor site complications. Compression garments were
worn day and night for six weeks, then during the day for another six weeks.
During the first postoperative day the patient developed a hematoma at the recipient site that
required surgical intervention. A small bleeding was identified in the major pectoral muscle.
During the second postoperative day one of the drains could be removed. On the fourth day
following surgery the remaining drains were removed and the patient was discharged.

**OUTCOME AND FOLLOW-UP**

The patient was seen in our outpatient clinic two weeks after surgery. The patient was also seen
three months post operatively for a final evaluation of the result and was offered planning of
eventual revisional surgery, nipple reconstruction and thighplasty on the contralateral thigh. Both
the reconstructed breast and the donor site presented with satisfying results, see figure 3 and
figure 4. However, due to unwanted hair growth on the reconstructed breast the patient was
offered laser hair removal therapy.

**DISCUSSION**

The VMG flap was initially described as a cross-legged flap in 1972 by Orticochea.[4] The
technique was modified by McCraw et al. in 1976, using a pedicled flap for vaginal
reconstruction.[5] The same year the first free VMG flap was described by Harii et al. for
reconstruction of the face and the lower limb.[6]
Since then there has been a shift towards the use of the TMG flap. This is most likely due to a
combination of; a better understanding of the vascular anatomy,[7] more reliable skin paddle,
faster dissection and a smaller scar.
To our knowledge this is the first case describing the use of a VMG flap for breast reconstruction
in a MWL patient. The TMG flap has previously been used for breast augmentation in a small
case series of massive weight loss patients,[8] and is well described for breast reconstruction in
the non-MWL population.[3]
The DIEP flap is often considered the gold standard for breast reconstruction of the medium to
large sized breasts in the non-MWL population. It has a good volume of soft tissue, giving
excellent outcomes and a rather low donor site morbidity. Some patients would even argue that
the donor site improves after harvesting the excess tissue. The TMG flap harvested from the
upper medial thigh is an excellent option for reconstruction of smaller breasts, as it is possible to
harvest 200-400 g of tissue. Just as for the DIEP flap the donor site morbidity is rather low. Both
the DIEP flap and the TMG can be used for unilateral and bilateral primary and secondary
reconstructions.
What is truly interesting with the case presented, is that it showcases that free flaps can be
suitable for breast reconstruction in the MWL population. The often larger perforators in
combination with excess tissue, enables a different approach to reconstructive breast surgery. It is possible to harvest bigger flaps compared to the non-MWL population. Depending on the type of body contouring surgery the MWL patient has been through different flap options can be lost, due to lack of tissue and possibly loss of donor vessels, e.g. loss of the DIEP flap option after an abdominoplasty.

It also opens up for the possibility of combining body contouring surgery of certain areas with concomitant breast reconstruction. There is a need for further studies comparing the outcome of free flaps and others means of reconstructive breast surgery in the MWL population, both with regard to complications and aesthetic outcomes.

We believe that free flaps should be considered a viable option for autologous breast reconstruction in MWL patients. However, meticulous care should be taken when choosing cases, due to the increased risk of postoperative complications in this patient group. Measures should be taken to decrease the risks as much as possible prior to surgery, e.g. cessation of smoking, BMI<30 and well regulated/treated comorbidities. Furthermore, one should take into consideration the possibly need for further/revisional surgery when choosing the reconstructive modality aiming to keep the number of surgeries as low as possible. Our case will most likely require a contralateral thighplasty to achieve symmetry, and possibly a nipple reconstruction. In this case the left thigh would not be ideal for a free flap, due to the lymphedema; otherwise the left thigh could have posed a possible rescue flap if the primary flap was unsuccessful. One could therefore argue that for this particular patient the left thighplasty for symmetry could have been carried out during the same procedure. However, we chose not to do this to reduce time for surgery as well as surgical stress.

**LEARNING POINTS**

- Free flaps are a viable option for breast reconstruction in MWL patients.
- The excess tissue in MWL patients in combination with often larger perforators enables novel and interesting reconstructive options.
- Meticulous patient selection is mandatory when performing breast reconstructing using free flaps in MWL patients.
REFERENCES


FIGURE CAPTIONS

**Figure 1.** The patient preoperatively.

**Figure 2.** Intraoperative raising of the vertical myocutaneous gracilis flap. Mosquito forceps presenting the donor vessels.

**Figure 3.** The patient at the three months follow-up.

**Figure 4.** The donor site preoperatively and at the three months follow-up.

PATIENT’S PERSPECTIVE

At the three-month follow-up, the patient was asked to share her experience.

“Ever since I got breast cancer and had to have my breast removed, I have had problems with the scar. It used to be very tight and causing me pain and I even had problems lifting my arm fully. I actually came here for a consultation regarding my thighs, and I mentioned the problems with the scar. This was when the doctor brought up that there might be a possibility for me to have breast reconstructive surgery. I was very happy and excited to hear this, since I did not think it
would be possible for me to get this type of surgery, due to my previous surgeries. I was given a lot of information regarding the surgery, possible complications, and long surgery time. I was also informed that it was not routine surgery. Despite all of this information I was never in doubt whether or not I should accept the surgery. Following surgery I felt very well taken care of at the hospital. All staff members were very kind and took a lot of interest in me and the surgery I have had.

I am very happy with the result, but to be honest what I am most grateful for is that all the pain I used to have is gone. The only thing I am not fully satisfied with is that there now is growing hair on my chest. So I am very happy that I will be referred to laser treatment for this. Currently I do not want further surgery, like a new nipple or correction of my other thigh. Overall I could not be happier that I decided to accept this surgery.

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**Date:** 28/9-21
The patient preoperatively.

90x42mm (300 x 300 DPI)
Intraoperative raising of the vertical myocutaneous gracilis flap. Mosquito forceps presenting the donor vessels.

135x101mm (300 x 300 DPI)
The patient at the three months follow-up.

110x46mm (300 x 300 DPI)
The donor site preoperatively and at the three months follow-up.

106x57mm (300 x 300 DPI)